

AOML**Miami, Florida**

Keynotes

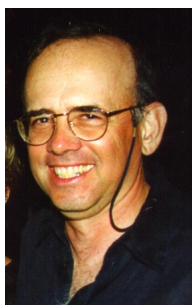
September-October 2002

Atlantic Oceanographic and Meteorological Laboratory

Volume 6, Number 9-10

Molinari Elected to Rank of AAAS Fellow

Robert Molinari, NOAA Senior Scientist with AOML's Physical Oceanography Division, was elected to the rank of Fellow of the American Association for the Advancement of Science in October 2002. Fellows are recognized for their meritorious efforts on behalf of the advancement of science or for applications that are scientifically or socially distinguished. Molinari was honored for his original contributions to the knowledge of ocean circulation variability, the widespread impact of his contributions, and for scientific leadership.



Molinari currently collaborates with German and Brazilian colleagues in studies of subtropical circulation cells in the Atlantic Ocean. He guides the Global Ocean Observing System (GOOS) Center at AOML and participates in NOAA, national, and international steering committees for ocean observations and climate observing systems.

The American Association for the Advancement of Science is the world's largest general scientific society. Its mission is to advance science and innovation throughout the world for the benefit of all people.

Columbus Day
October 14, 2002

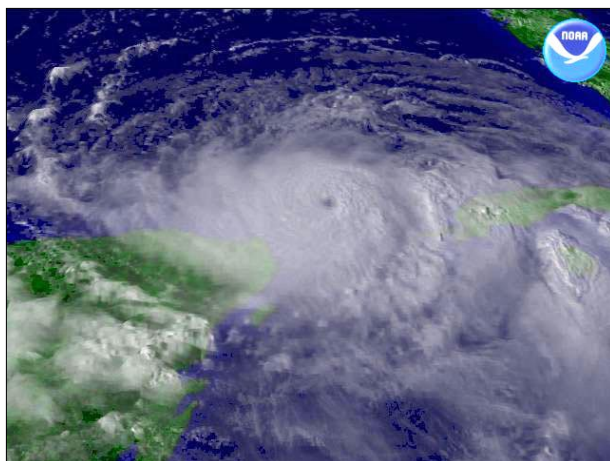
Isidore the Perfect Candidate for Rapid Intensification Study

Scientists with AOML's Hurricane Research Division (HRD) have been ready and waiting for three years for the perfect opportunity to monitor and measure a storm undergoing rapid intensification. Isidore, the season's second tropical cyclone to reach hurricane strength, provided that opportunity before making landfall in the Yucatan Peninsula on September 22nd.

"The key ingredient that we are watching is the warm ocean temperature profile below the sea surface that provides the primary source of energy that fuels hurricanes during the height of hurricane season from August through October," said Frank Marks, Acting Director of the Hurricane Research Division. Since 1998, Peter Black of HRD and Lynn Shay of the University of Miami have studied how areas of the ocean that have a deep layer of warm water near the surface contribute to allowing hurricanes to rapidly intensify, one of the most difficult situations to forecast and one of the most dangerous to residents along the coast. Their previous work focused on specific sources of deep warm water found in the Loop Current and large-scale eddies that spin off from this source and traverse the Gulf of Mexico.

On September 19th, the scientists dropped a series of ocean probes known as AXBTs and AXCPs (airborne expendable bathythermographs and current probes, respectively) from the two NOAA WP-3D airplanes. The probes were released in the projected path of Isidore in the southern Gulf of Mexico. The probes measured the ocean temperature and currents down to 200 meters (about 600 feet), the depth at which hurricane winds usually churn up colder water and cool the overall temperature of water below the storm. "The significance of Isidore being over the Gulf Stream Loop Current is that the warm water below extends to great depths, not allowing Isidore's winds to cool the surface temperature and thereby keeping the heat reservoir intact, allowing further intensification of the hurricane," said Shay.

During the second phase of the study, ocean probes were deployed both as Isidore passed over the same region, and then immediately afterwards. Black and Shay will study the difference in the ocean temperature structure between these (*continued on page 2*)



GOES-8 satellite image of Hurricane Isidore off the northeastern tip of the Yucatan Peninsula on September 21, 2002.



AOML is a research laboratory of NOAA's Office of Oceanic and Atmospheric Research located on Virginia Key in Miami, Florida



Combined Federal Campaign

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The annual CFC program enables federal employees to support thousands of non-profit charitable organizations and agencies through payroll deductions

**CFC 2002:
October 15-November 1**

**Kickoff Event:
October 15, 2002**

Individuals returning pledge forms by October 21st are eligible to participate in a drawing for prizes that include:

- Day of sailing (courtesy of Ryan Smith)
- One of two entertainment packages with AMC movie passes and concession coupons
- One of two gift certificates to Nordstrom in The Village at Merrick Park, Coral Gables
- Basket of homemade sweets including cookies and brownies

For more information contact:

**Erica Van Coverden
2002 CFC Coordinator**
(305) 361-4541
Erica.Van.Coverden@noaa.gov

(continued from page 1)

instrument deployments. During the time Isidore passed over the array of ocean probes dropped the day before, AOML and University of Miami scientists collected data that describe both the complete structure of Isidore and the ocean beneath the storm. "These data will allow for a more detailed analysis of the ocean's role in intensification, the eventual goal being a greater ability to predict when and how much a storm may intensify, a challenge considered to be the next key step in hurricane forecasting," said Black.

Marks notes that the ocean is not the only factor in hurricane intensity change. NOAA hurricane researchers also consider environmental data gathered around the storm by NOAA's Gulfstream-IV jet, a surveillance aircraft operated by NOAA's Aircraft Operations Center. Although the Gulfstream-IV missions are designed to improve track forecasts for landfalling hurricanes, an added benefit is measurement of the wind shear and environmental moisture and stability that can affect intensity. Wind shear is the difference in wind velocity at upper and lower levels in the atmosphere. High wind shear, dry air, and low stability are associated with weakening of tropical storms. Direct measurements of these variables are unavailable over the Gulf of Mexico without use of the Gulfstream-IV jet.

"We hope to discover the relative importance of the Loop Current and environmental wind shear in determining hurricane intensity change," Black says. Black and Shay hope that data gathered during this study will enhance knowledge and predictability of major hurricanes, which translates into improved intensity forecasts, increased warning time, and better preparedness in coastal regions.

NOAA press release of September 24, 2002. Contact: Jana Goldman (Jana.Goldman@noaa.gov or 301-713-2483) or Erica Van Coverden (Erica.Van.Coverden@noaa.gov or 305-361-4541).

New Design Improves Durability of CREWS Stations

Coral Reef Early Warning System (CREWS) monitoring stations are sporting a new look due to a radical design change by scientists with AOML's Ocean Chemistry Division (OCD) to improve their functioning and durability. The new design features a long fiberglass piling anchored to the seafloor by a ball-and-socket joint, plus chain rigging and synthetic line that allows for flexibility in response to wave action and tidal excursion, similar to a shock absorber. In the presence of heavy seas and winds, the piling is capable of tilting, greatly minimizing the chance of damage to the surrounding benthic communities and enhancing the station's ability to remain operational.

OCD scientists worked with a naval architect to carefully re-engineer instrument locations. Oceanographic instruments float on a secure ring that maintains a constant depth of 1 meter. Atmospheric instruments, located on a platform at a height of 5 meters, measure the critical air mass right above the ocean, while mast-mounted anemometers at 10 meters accurately measure wind speed and direction. Each platform can be raised or lowered by hand, permitting routine maintenance from a small support vessel.

CREWS stations installed in the U.S. Virgin Islands at the Salt River Bay National Historical Park and Ecological Preserve in St. Croix and John Brewer's Bay in St. Thomas are the first to feature the new design. Additional CREWS stations will be installed at other coral reef sites in the United States, Puerto Rico, American Samoa, and Guam. Collectively, the stations will form a network to acquire long-term data sets of environmental conditions at coral reef locations. The work is being carried out under the aegis of NOAA's Coral Reef Watch program.



The Salt River Bay CREWS station in St. Croix features a new design that should enable it to remain functional in heavy seas and winds.

CO₂ Group Hosts Workshop

The Ocean Chemistry Division's CO₂ group (Rik Wanninkhof, Robert Castle, Betty Huss, Esa Peltola, and Kevin Sullivan) hosted a workshop at AOML on October 2-3, 2002. Twenty experts who specialize in building and operating systems to measure the partial pressure of carbon dioxide (pCO₂) in ocean surface waters gathered to design uniform instruments for future studies. This work is in support of a major objective of the NOAA contribution to the U.S. Carbon Cycle Science Plan of mapping global sources and sinks of CO₂. The effort requires a significant increase in observational capacity using Volunteer Observing Ships (VOS).

During the workshop the scientists, who hailed from as far away as Germany and Hawaii, described the systems they currently used and elaborated on future improvements. Strengths and weaknesses of the different systems were assessed and formed the basis of a communal system designed with a focus on accurate measurements, robustness, reasonable cost, and ease of maintenance.

The group decided to continue their interaction as a virtual working group using a web site (www.aoml.noaa.gov/ocd/pco2) as the main venue for idea exchange. The workshop was underwritten by the Global Carbon Cycle Program of NOAA's Office of Global Programs.

Pot-Luck Luncheon

November 15, 2002

12 Noon

AOML Lobby

**Bring a Dish to
Share With Others**

For more info contact:

Alejandra Lorenzo

(305-361-4404 or

Alejandra.Lorenzo@noaa.gov)

Budding Scientists Win Trip Aboard the *Ronald H. Brown*

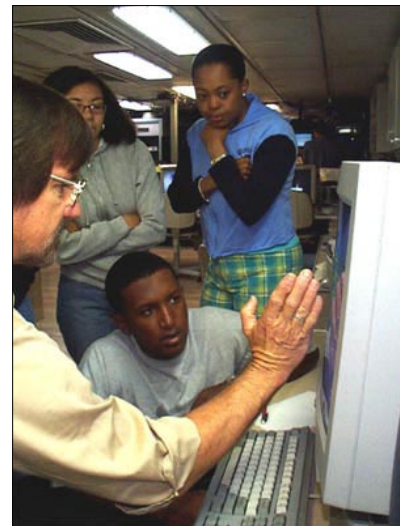
Erica Van Coverden, Office of the Director

The NOAA ship *Ronald H. Brown* recently gave a handful of high school students an end-of-summer cruise like they've never experienced before. Four students who successfully competed in the NAACP's Afro-Academic, Cultural, Technological, and Scientific Olympics (ACT-SO) won an invitation to spend five days on a research cruise. Six NOAA scientists participated as physics and biology judges at the national ACT-SO competition and selected four national science competitors to cruise aboard the *Ronald H. Brown* from August 19-24, 2002.

Ashley Heilprin, Leigh Hernandez, Yolanda Brooks, and Aaron Brown began their trip with a tour of the two Miami NOAA labs participating in the cruise, the Atlantic Oceanographic and Meteorological Laboratory (AOML) and the Southeast Fisheries Science Center (SEFSC). After lunch at the neighboring University of Miami's Rosenstiel School, the students headed to the Port of Miami and began their journey.

The students quickly adapted to life at sea and greatly enjoyed learning about the research objectives for their cruise. They assisted scientists in a multifaceted study conducted by AOML of the bottom topography seaward of the coastal shelf of Fort Lauderdale, Miami, and Key Biscayne, Florida. They also participated in a joint SEFSC-AOML calibration study to monitor marine mammals using acoustic technology. The crew of the *Ron Brown* was gracious in giving of their time and energy, answering questions, conducting tours, and ensuring the students had a memorable experience aboard ship. The students reciprocated by inviting all hands to a science presentation where they detailed the week's science mission and results. They also discussed the biological, physical, and geological projects each of them had presented in the ACT-SO competition. "I was inspired to see their enthusiasm and the intelligence of such young minds," said Bruce Cowden, Chief Bowsen aboard the *Ronald H. Brown*.

ACT-SO is a major youth initiative of the National Association for the Advancement of Colored People (NAACP) designed to prepare, recognize, and reward African-American youth who exemplify scholastic and artistic excellence. ACT-SO provides a forum through which African-American youth demonstrate and gain recognition for academic, artistic, and scientific prowess and expertise. "This is a great group of young folks, and the *Ronald H. Brown* is privileged to have had them aboard as members of the South Florida Plume Study science team. They were actively involved in the science, were interested in ship operations, and were excellent ship mates. I hope we might see them again in the future as NOAA scientists or NOAA commissioned officers," said Capt. Donald A. Dreeves, Commanding Officer of the *Ronald H. Brown*.



Lead Scientist Jules Craynock of AOML (left) describes ocean bottom features and mapping techniques to Yolanda Brooks, Aaron Brown, and ACT-SO national coordinator Cherese Williams.



Yolanda Brooks learns about water sampling from Charles Featherstone of AOML's Ocean Chemistry Division.



"Spring Forward, Fall Back"
Daylight Savings Time Ends October 27, 2002



AOML has a new asset for local meetings and outreach: a new compact, mobile, table-top display (currently in the lobby advertising the Combined Federal Campaign program). The display is available for use by everyone at AOML. Please see Erica Van Coverden for information or for checking out the display (305-361-4541 or Erica.Van.Coverden@noaa.gov).

Blood Drive

October 25, 2002

9:00 a.m.-12:30 p.m.

AOML Parking Lot

Register at the
receptionist's desk
in the lobby

Sponsored by:
Community Blood
Centers of South Florida

Correction: The July-August 2002 issue of *Keynotes* reported that the addition of H*Wind technology to forecasts at the National Hurricane Center would improve their accuracy for landfalling storms. H*Wind is not a forecast tool but a method of diagnosing the surface wind field at a particular time based on observations from a variety of sources collected over a time period of 4-6 hours. Improvement in forecast accuracy of the hurricane track derives from synoptic surveillance and targeted observations.

PORSEC 2002 Meeting Focuses on Remote Sensing

AOML Director Kristina Katsaros attended the Pan Ocean Remote Sensing Conference (PORSEC) in Bali, Indonesia on September 3-6, 2002. PORSEC provides a common platform for scientists and engineers to exchange ideas about remote sensing technology and its applications to various fields as they relate to the world's oceans, including underwater optics, acoustics, meteorology, and physical, chemical, biological, and geological oceanography. Since 1992, PORSEC meetings have occurred biannually in countries around the Pacific Ocean such as Australia, Japan, Canada, China, and India. Katsaros is a Vice President of the organization.

Women were well represented at this international meeting (see top figure). Many of these young scientists perform research related to fisheries and ecology issues. Indonesia honored the PORSEC association by reading its Declaration to the World Summit on Sustainable Development at the opening ceremonies.

The bottom photograph illustrates NOAA's presence in a developing capability on Bali Island, Indonesia. Katsaros visited this newly established Advanced Very High Resolution Radiometer (AVHRR) receiving station (similar to the one on AOML's roof used for the CoastWatch program) with Dr. Eric Lindstrom of NASA (currently the Director of the Interagency Office, Ocean U.S.). The host of the visit, Dr. Hartanta Tarigan, is Director of the Ministry of Marine Affairs and Fisheries, Republic of Indonesia. He appears in the center of the photograph.



Women were well represented at the 2002 PORSEC meeting in Bali, Indonesia.



Drs. Kristina Katsaros, Hartanta Tarigan, and Eric Lindstrom in front of an Advanced Very High Resolution Radiometer (AVHRR) receiving station on Bali Island.

Costume Contest

Oktoberwe'en

Wednesday, October 30th

don't forget
your costume!

4:00 p.m.



AOML Picnic Shack



Contact Neal Dorst for more info
(305-361-4311 or Neal.M.Dorst@noaa.gov)

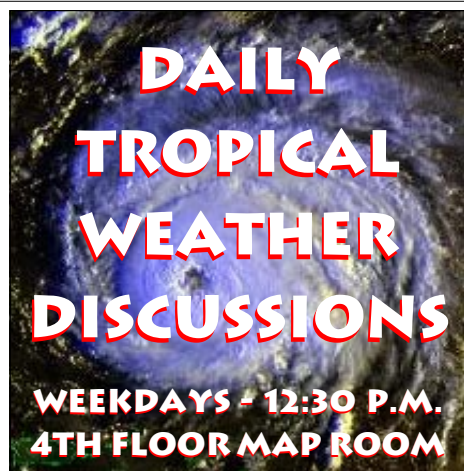
Morisseau-Leroy Recognized by Oracle Corporation

Nirva-Morisseau Leroy, a University of Miami/CIMAS Oracle Database Administrator and senior application developer with AOML's Hurricane Research Division, was recently selected by Oracle Magazine (Oracle Corporation) as its Most Innovative Application Developer for 2002. Oracle is the world's second largest independent software company and the leading supplier of software for information management. Morisseau-Leroy received the award in recognition of her efforts to create and develop database applications using cutting-edge technologies (Java, JDBC, SQLJ, and Oracle9i database).



She is a member of the H*Wind team that developed the H*Wind application, a global tropical cyclone monitoring software tool written in Java that assists atmospheric researchers in determining the intensity and radial extent of maximum sustained winds in tropical weather systems. Forecasters at the National Hurricane Center have begun using H*Wind and hope to fully integrate its use during the 2003 hurricane season.

Morisseau-Leroy has presented numerous seminars about H*Wind and Oracle products and has served as an instructor at several user conferences. She recently completed her fourth book, *Oracle 9ias: Building J2EE Applications*, published by Osborne-McGraw Hill, and due out in bookstores in October.



Congratulations

Neal Dorst, meteorologist with the Hurricane Research Division, had an original painting of Hurricane Andrew published in the September 2002 issue of the *Bulletin of the American Meteorological Society* (Volume 83, Number 9, page 1297). Neal created the work using acrylic paint on a 4 ft by 5 ft stretched canvas. The painting is currently on display across from the entrance to the NOAA Miami Regional Library at AOML.

Welcome Aboard

Carlos Fonseca joins the staff of the Physical Oceanography Division as a CIMAS Associate to assist in processing expendable bathythermograph (XBT) and conductivity-temperature-depth (CTD) data obtained from research and high density XBT cruises. Mr. Fonseca is from Sao Paulo, Brazil, along with his wife Marcia and recently born (4th of July) daughter Ana Clara. He holds a M.S. degree in oceanography from the University of Sao Paulo.

Miguel Izaguirre joins the staff of the Office of the Director as a CIMAS Associate to assist with AOML's data integration project, part of NOAA's Coastal Storms Initiative. He has worked at the University of Miami since 1989 where he obtained a M.S. degree in marine and atmospheric chemistry.

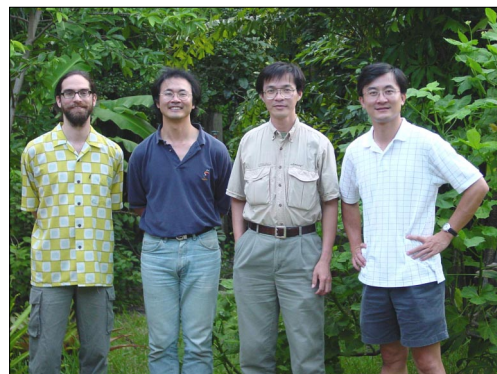
Wilma Jeffris joins the staff of the Ocean Chemistry Division to assist Dr. Kelly Goodwin as a technician in the Microbial Biogeochemistry Laboratory. Ms. Jeffris is an undergraduate student at Florida International University majoring in chemistry.

Qian Li joins the staff of the Ocean Chemistry Division to assist Dr. Jia-Zhong Zhang in the Nutrient Laboratory. Mr. Li is a Ph.D. candidate in oceanography at the University of Miami's Rosenstiel School. He hails from the People's Republic of China where he holds a B.S. degree in marine science and a M.S. degree in analytical chemistry.

Xiangdong Xia joins the staff of the Physical Oceanography Division as a CIMAS Research Associate to be a team member of the U.S. Argo Data Assembly Center and Environmental Data Server Project at AOML. He has a M.S. degree in physical oceanography from the Chinese Academy of Science and a M.S. degree in computer engineering from Mississippi State University.

HRD Collaborates with Taiwanese on Hurricane Forecasts

AOML's Hurricane Research Division (HRD) has been hosting five visitors from Taiwan during the hurricane season so that they can learn how the annual Hurricane Field Program is conducted. The ultimate goal is for the Taiwanese to begin flying synoptic surveillance missions around typhoons during 2003 with their newly-acquired Gulfstream-100 aircraft. Chun-Chieh Wu of the National Taiwan University is heading the program in Taiwan, and he spent a few days in early September at HRD. The first set of meteorologists, Ching-Hwang Liu of the Taiwan Culture University and Po-Hsiung Lin of the National Taiwan University, visited during the quiet month of August and flew missions into Tropical Storms Edouard, Fay, Gustav, and Hanna. In early September, they were replaced by Jing-Shan Hong of Taiwan's Central Weather Bureau, and Pay-Liam Lin of the National Central University, who arrived just in time to fly into Hanna and many missions into Isidore. They hope to build on the success of HRD's leadership in synoptic surveillance, which during the last two years has produced more than 50% reduction in track forecast errors of major hurricanes.



Sim Aberson (HRD), Ching-Hwang Liu (Taiwan Culture University), Po-Hsiung Lin, and Chun-Chieh Wu (both with the National Taiwan University).

Travel

Rik Wanninkhof attended NOAA's Carbon Cycle Workshop in Boulder, Colorado on September 24-27, 2002.

Elizabeth Johns and Peter Ortner attended the Southeast Coastal Ocean Observing System (SE-COOS) meeting in Chapel Hill, North Carolina on September 30-October 1, 2002.

James Hendee attended the Eighth Meeting of the U.S. Coral Reef Task Force in San Juan, Puerto Rico on October 1-4, 2002.

Kristina Katsaros attended the Second GOES User's Conference in Boulder, Colorado on October 1-3, 2002.

Sang-Ki Lee attended the 6th Meeting for Users of the Hybrid Coordinate Ocean Model (HYCOM) in Albuquerque, New Mexico on October 6-9, 2002.

Kelly Goodwin and Sara Cotton attended the Florida Marine Biotechnology Summit III in Fort Pierce, Florida on October 7-8, 2002.

David Palmer attended the Second International Conference on the Oceanography of the Eastern Mediterranean and Black Sea in Ankara, Turkey on October 12-18, 2002. He will also attend a workshop at the Marine Hydrophysical Institute (MHI) in Sevastopol, Ukraine on October 22-25, 2002.

Steven Cook will attend the Data Buoy Cooperation Panel and Joint Tariff Agreement meetings in Martinique on October 12-23, 2002.

Tsung-Hung Peng will attend the 11th Annual Meeting of the North Pacific Marine Science Organization (PICES) in Qingdao, People's Republic of China on October 15-25, 2002.

David Enfield, Stanley Goldenberg, Christopher Landsea, and Alberto Mestas-Núñez will attend the 27th Climate Diagnostics and Prediction Workshop in Fairfax, Virginia on October 21-25, 2002.

Explorer Passengers Introduced to Microbiology

While sailing aboard the *Explorer of the Seas* as a visiting scientist this past August, Kelly Goodwin, a University of Miami/CIMAS microbiologist with AOML's Ocean Chemistry Division, carried out a simple experiment to introduce interested passengers to the world of microbiology. The laboratory segment, entitled *Seawater: More than Meets the Eye*, was designed solely for scientific outreach.

Passengers were invited to visit Goodwin in the *Explorer's* Ocean Lab to learn more about marine bacteria. More than 100 passengers took up the offer. Goodwin and assistant Jordana Nance, a high-school student, grew bacteria from seawater samples to help convey the concept of hypothesis-based research. Common microbiology techniques such as serial dilution, spread plating, and the use of selective media were also demonstrated. "I wanted to give the passengers a hands-on experience in the Ocean Lab," said Goodwin.

As part of the experiment, Goodwin and Nance performed a series of dilutions on seawater to reduce the populations of microorganisms in their samples to manageable numbers. The serially-diluted seawater was then spread across the surface of petri plates containing either marine or nutrient agar. These are selective media, and marine bacteria preferentially grow on marine agar while terrestrial bacteria grow better on nutrient agar. "The hypothesis was simple: more bacteria would grow on the marine plates," said Goodwin. "The point was to have a simple, fun scenario that could be explained in less than 10 minutes but still convey basic scientific concepts," she added.

As bacterial colonies grew, Goodwin and Nance counted the number of colony-forming units. A large poster prominently displayed in the Ocean Lab outlined the experiment. During the tours, passengers had a chance to ask questions and observe the bacterial growth on the spread plates. Passengers could follow the progress of the experiment by checking the window of the *Explorer's* Atmospheric Lab for posted results.

This was the first time a visiting scientist brought a laboratory demonstration aboard the *Explorer* for the purpose of scientific outreach. Goodwin hopes it will encourage others to design simple demonstrations. "With so many activities available aboard the ship, the passengers who visited the Ocean Lab came by choice," said Goodwin. "They were interested and curious. It was a great experience."

The *Explorer of the Seas* is one of the largest passenger ships in the Royal Caribbean Cruise Lines fleet. Its visiting scientist program, active for the past two years, is a collaborative effort between Royal Caribbean Cruise Lines, the University of Miami, NOAA, and the National Science Foundation.



Jordana Nance in the Ocean Laboratory aboard the *Explorer of the Seas* performs serial dilutions on seawater.

View Keynotes online: <http://www.aoml.noaa.gov/keynotes>

Keynotes is published bi-monthly by the Atlantic Oceanographic and Meteorological Laboratory. Contributions and/or comments are welcome and may be submitted via email (Gail.Derr@noaa.gov), fax (305-361-4449), or mailing address: NOAA/AOML, *Keynotes*, 4301 Rickenbacker Causeway, Miami, FL 33149.

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